

Harmful Algal Blooms (HABs) in the Great Lakes



Satellite image of the HAB event during the 2014 shutdown of Toledo's drinking water treatment facility. Credit: NASA

HABs threaten public health and recreation

Harmful algal blooms (HABs) in the Great Lakes occur when algae grow rapidly forming dense scums and water discoloration. Some blooms can produce neurotoxins, liver toxins, and/or skin irritants. The toxins can contaminate drinking water, harm swimmers and pets in areas where toxins concentrate, and pose a severe nuisance to recreational and commercial boating and fishing.

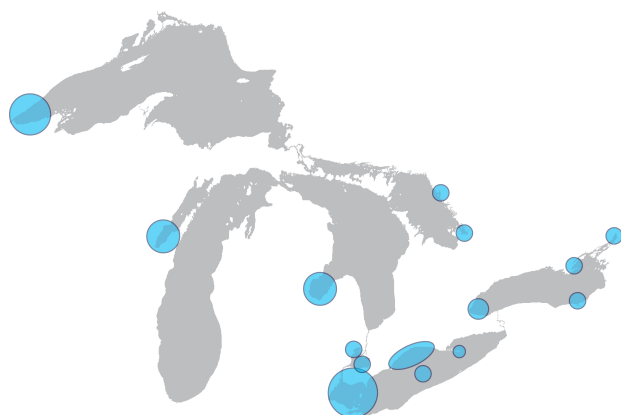
What causes the blooms?

Blooms are caused by excess nutrients entering the lake. Heavy rain events wash soil and fertilizer containing excess phosphorus and nitrogen into rivers and streams that flow into lakes. Additional nutrient sources include sewage treatment plants, combined sewer overflows, water treatment plants, cleaning products, faulty septic tanks, and residential lawn fertilizers.

What happens if there is a big bloom?

The impact of the bloom depends on its toxicity, location, size, and duration. In the western and central Lake Erie basins, the NOAA-supported Lake Erie HAB bulletin, experimental Lake Erie HAB Tracker, and Lake Erie HAB data share provide information about the current location of the bloom and predict its location over the next few days. This helps stakeholders target their response to minimize impacts. Through the use of this information:

- Water treatment managers can chemically treat the water, turn off the water intake, or stockpile water in reservoirs.
- State agencies guide toxin sampling efforts and close beaches where toxins exceed recreational swimming standards as well as issue warnings for pets.
- Commercial and recreational boaters plan activities that are outside of the bloom.



Known HAB locations in the Great Lakes

Harmful algal blooms occur throughout the Great Lakes basin. NOAA's Great Lakes Environmental Research Laboratory (GLERL) and the Cooperative Institute for Great Lakes Research (CIGLR), along with other partners, monitor trouble areas in Lakes Erie, St. Clair, and Huron (Saginaw Bay). For more, visit www.glerl.noaa.gov/res/HABs_and_Hypoxia. Credit: NOAA GLERL



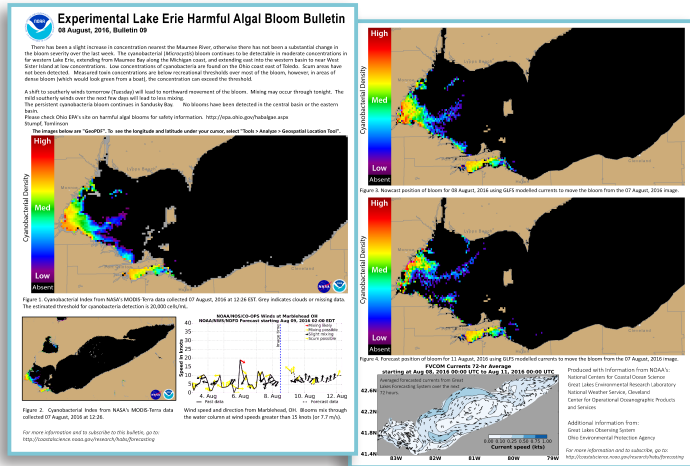
*Credit:
NOAA GLERL*

The 2014 Toledo bloom

In 2014, Toledo, Ohio officials issued a two-day ban on drinking and cooking with tap water for more than 400,000 residents due to toxins concentrations that exceeded the World Health Organizations guideline level for safe drinking water. These toxins were a result of an algal bloom that was occurring in western Lake Erie. The economic impact of the 2014 bloom has been estimated at \$65 million. This event served as a wake-up call that HABs can pose serious threats to human health, drinking water safety, and water-dependent businesses and activities.

Sampling a harmful algal bloom in western Lake Erie near the Toledo water intake crib on August 4, 2014. For more on tracking toxicity of Lake Erie Algal Blooms, watch a video, produced by the University of Michigan, here: bit.ly/1OwuQHM.

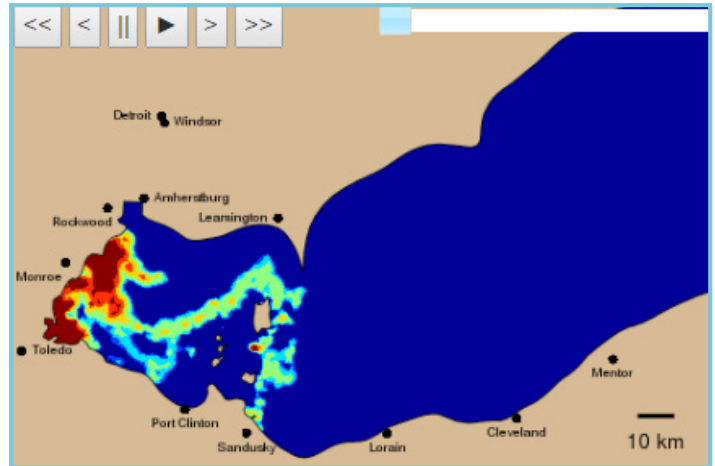
NOAA forecasts and monitors HABs for Lake Erie's drinking water and recreational managers



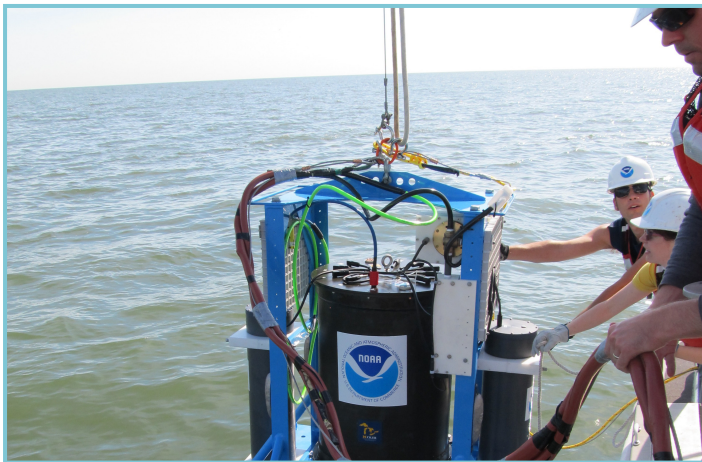
Example of the Lake Erie HAB Bulletin. The Bulletin depicts the HABs' current location and forecasted movement, as well as graphs the winds and currents. To view the Bulletin or to receive it via email, visit go.usa.gov/xNGeu.

FORECASTING

HAB forecasts allow managers to prepare for and respond to blooms. NOAA starts estimating bloom severity in early May to guide water treatment facility managers in ordering the right amount of chemicals to keep tap water safe. In July, NOAA issues a seasonal HAB forecast of bloom severity that is similar to NOAA's seasonal hurricane and tornado forecasts. Throughout the bloom season (July-October), a twice-weekly bulletin provides bloom extent and trajectory, and an experimental HAB Tracker provides 5-day outlooks of bloom trajectory and concentrations.



Example of the experimental Lake Erie HAB Tracker 5-day forecast animation—a new tool that combines satellite imagery, monitoring, and modeling to produce daily 5-day forecasts of bloom movement and intensity. See go.usa.gov/xNGeM, for more.



Deployment of NOAA GLERL's Environmental Sample Processor (ESP) in western Lake Erie. This 'lab in a can' technology allows for faster measurements of HAB toxicity. For more, visit go.usa.gov/xNGet.

MONITORING

NOAA monitors blooms in parts of Lake Erie and Lake Huron in partnership with state agencies, universities, water treatment facilities, and a citizen monitoring network. Boats, buoys, and sensors are used to measure toxins, nutrients, and algal pigments (chlorophyll). An Environmental Sample Processor, also known as a 'lab in a can,' placed in a likely bloom location near the Toledo water intake crib, provides near-real-time toxin monitoring.



Stone Laboratory, Ohio State University's island campus on Lake Erie (top), and the NOAA GLERL facility in Ann Arbor, Michigan (bottom) serve as bases for scientists addressing HABs research across the Great Lakes.

RESEARCH

NOAA research priorities include predicting toxicity, improving toxin detection, and understanding health and economic impacts of blooms. Research efforts by NOAA scientists are complemented by research grants funded by NOAA, EPA-Great Lakes Restoration Initiative, and National Science Foundation. The State of Ohio is contributing \$6.8 million to better track blooms, study health impacts, inform water treatment, and engage citizens.

For additional information, contact:

Michael.Jarvis@noaa.gov
202-482-3595

www.noaa.gov/what-is-harmful-algal-bloom

